

Allergy to polyethylene glycols

This factsheet aims to answer some of the questions you and your family might have if you are diagnosed with or suspect allergy to polyethylene glycols (PEGs). Our aim is to provide information that will help you understand your allergy and minimise risks.

What are polyethylene glycols (PEGs)?

PEGs, also known as macrogols, are chemicals found in many everyday products including:

- **medications:** laxatives (like Movicol®), steroid injections, painkillers, antibiotics, and some vaccines
- **personal care items:** toothpaste, shampoo, lotions, soaps, and cosmetics
- **medical supplies:** ultrasound gels, bone cement, surgical sealants and wound dressings

Types of PEGs

PEGs come in different molecular weights, which can affect the likelihood of an allergic reaction.

Generally, higher molecular weight PEGs (e.g., PEG 3350, PEG 4000), found in active ingredients like some laxatives, are more likely to cause allergic reactions.

Lower molecular weight PEGs, often used in personal care products (such as toothpaste, mouthwash, hand sanitisers, and moisturisers), tend to be less associated with allergies, but they can still cause reactions in some people.

PEGs may not always be clearly labelled in product ingredient lists. It can appear as:

- “PEG”
- “macrogol”
- a number (e.g., PEG 3500)

Why are PEGs used as an ingredient in medications?

PEGs are commonly added to medicines to help them work more effectively. It can:

- improve how a drug dissolves in the body.

- make creams and ointments smoother.
- extend the time a drug stays active in the body (a process known as PEGylation).

PEGylated medications are used in treatments for cancer, gout, hepatitis, and some immune conditions.

How common is PEG allergy?

PEG allergy is very rare, affecting fewer than 1 in 10,000 people. Despite its widespread use in medicines and personal care products, only a small number of cases have been reported in medical literature. However, when PEG allergy does occur, it can cause severe reactions, including anaphylaxis.

Has PEG allergy become more common?

Interest in PEG allergy grew during the COVID-19 pandemic when it was suspected as a possible cause of rare allergic reactions to mRNA vaccines (Pfizer-BioNTech and Moderna).

PEG is used in these vaccines to protect and stabilise the mRNA. However, studies have since shown that severe allergic reactions to these vaccines are extremely rare, occurring in about 2.5 to 4.7 people per million doses. This suggests that its actual prevalence may not have increased. The rise in awareness is likely due to greater public and medical interest, rather than a surge in cases. More research is still needed to confirm this.

Who is most at risk of PEG allergy?

- **History of multiple drug allergies:** people with unexplained allergic reactions to different, unrelated medications (within minutes to hours of exposure) may be at higher risk.
- **Repeated use of PEG-containing medications:** some reactions have been linked to laxatives, depot-steroid injections, and certain antibiotics.
- **Women:** women may be more commonly affected, possibly due to exposure from cosmetics and personal care products.

Can some people tolerate small amounts of PEG?

Some people with PEG allergy may tolerate small amounts of PEGs without a reaction. For example, studies suggest that even individuals with severe PEG-allergy have safely received COVID-19 vaccines as these contain only very small amounts (0.05 mg) of PEG 2000.

This suggests that higher molecular weight PEGs and larger doses are more likely to trigger

allergic reactions. Additionally, studies suggest that lower molecular weight PEGs may require higher exposure levels to cause an allergic reaction. However, PEG allergy does not always follow a predictable pattern, and each individual has their own threshold for reactions. This is still under investigation.

Could I have a PEG allergy? What are the symptoms?

A PEG allergy may be suspected if you experience severe allergic reactions shortly after taking a medication, especially when the cause is unclear, or if you have repeated immediate allergic reactions to different medications or products containing PEGs.

- **Multiple drug allergy:** people with a PEG allergy may react to several, structurally unrelated drugs that contain PEGs, which can make diagnosis and avoidance more challenging, e.g.: laxatives, injected corticosteroids, or antacids.
- **Oral and injectable medications:** reactions can occur with both oral and injectable medications containing PEGs.

Reactions to PEG are typically rapid and severe.

What are the symptoms of PEG allergy?

The symptoms of a PEG allergy can range from mild to severe.

Mild to moderate symptoms may include:

- a red raised itchy rash (known as hives or urticaria) anywhere on the body
- swelling of the face, lips and/or eyes
- a tingling or itchy feeling in the mouth
- mild throat tightness
- stomach pain, vomiting or diarrhoea

These symptoms can also happen on their own. If you don't have the ABC symptoms listed below, the reaction is likely to be less serious and is not the same as anaphylaxis but watch carefully in case ABC symptoms develop.

More serious symptoms (anaphylaxis)

In some cases, the reaction can be life-threatening, this is known as anaphylaxis (pronounced ana-fil-ax-is). Most healthcare professionals consider an allergic reaction to be anaphylaxis when it involves difficulty in breathing or affects the heart rhythm or blood

pressure. Any one or more of the following symptoms may be present – these are often referred to as the **ABC** symptoms.

- **AIRWAY** - swelling in the throat, tongue or upper airways, hoarse voice, difficulty swallowing
- **BREATHING** - sudden onset wheezing, breathing difficulty, noisy breathing, persistent cough
- **CIRCULATION** - dizziness, feeling faint, sudden sleepiness, confusion, pale clammy skin, loss of consciousness or collapse

In extreme cases there could be a dramatic fall in blood pressure. The person may become weak and floppy and may have a sense of something terrible happening. Any of the ABC symptoms may lead to collapse and loss of consciousness and, on rare occasions, can be fatal.

[Read more about anaphylaxis](#) or [what to do in an emergency](#).

A history of allergic reactions to foods and non-covid vaccines does not pose a risk for PEG allergy. If your drug allergy has been confirmed, or always occurs after the same type of medication, then you are not at risk of allergy to PEG. People with chronic urticaria or angioedema are not at risk of allergy to PEG.

What should you do if you think you have a PEG allergy?

PEG allergy is very rare, but if you suspect you have it, you should speak to your GP (doctor). They will review your medical history and any past allergic reactions to help determine if PEG might be the cause.

Steps to take:

1. **Review your medications:** if you regularly take medicines that contain PEG without a reaction, a PEG allergy is less likely.
2. **Keep a reaction diary:** note products used and time before symptoms started, this will help your consultant rule out any medications you have safely taken in the past.
3. **See your GP:** given the complexity of PEG and other drug allergies, your doctor may refer you to an allergy specialist if they believe that your symptoms indicate a PEG allergy.
4. **Referral to a specialist:** only a small number of allergy clinics in the UK have expertise in diagnosing PEG allergy. Your GP can find a specialist drug allergy clinic

through the British Society for Allergy and Clinical Immunology (BSACI): [Find a Clinic](#). Unfortunately, access to specialist drug allergy services varies by location, which can result in long waiting times.

5. If your GP does not have any experience in managing drug allergies, there is more information in the following guidance: [NICE - Drug allergy: diagnosis & management](#).

How Is PEG allergy diagnosed?

If referred to an allergy clinic, the specialist will:

- take a detailed history of your symptoms and past reactions to PEG-containing products.
- consider allergy skin tests: these must be done under medical supervision in a specialist clinic as PEG testing carries a risk of severe reactions. **Do not try to test for PEG allergy at home using laxatives, cosmetics, or other PEG-containing products.**

Why testing is not always necessary

Because PEG allergy is so rare, unnecessary testing should be avoided in people without a history of suspected allergic reactions. If you have concerns, speak with your GP, who can help determine whether further testing is needed.

Managing a PEG allergy

Avoiding PEGs

If you have a confirmed PEG allergy, your allergy specialist will give advice on which products you should avoid. Always check medicine and cosmetic labels carefully for PEGs or macrogols. Some medicines will list all ingredients on the outer packaging along with the active ingredients. Others will list the ingredients only in the patient information leaflet (section 6.1 of the leaflet) found inside the medicine box.

Below is a list of some items that may contain PEGs.

- **Laxatives** (such as Movicol)
- **Depot steroid injections**
- **Medicines** (such as painkillers, antibiotics, antacids, suppositories)
- **Creams and lotions** (products labeled "hydrating" or "long-lasting" often contain PEG)

- **Hand soaps**
- **Shower gels**
- **Hair products** (shampoos, conditioners, hair dyes, shaving creams)
- **Dental products** (toothpaste, mouthwash)
- **Bone cements** used in joint surgeries
- **Cleaning products** (dishwasher tablets and laundry detergents)
- **PEG is rarely in foods** but may appear in food-grade coatings or thickeners (labelled as E1521)

If you have a confirmed PEG allergy, you should always report this to your healthcare providers (doctors, nurses, pharmacists, anaesthetists, dentists), as well as to your hairdresser, or other aesthetic practitioners.

Your pharmacist may be able guide you on finding suitable alternatives for specific items such as laxatives, cosmetics, or medications.

Treatment for PEG allergy

If you have a confirmed PEG allergy:

- you should receive written documentation from your allergy clinic outlining your allergy.
- it is recommended that you wear a medical alert bracelet or pendant to inform healthcare providers in case of an emergency.
- since PEGs are not always easy to avoid, you should be prescribed adrenaline for use in an emergency.

Unlike other drug allergies, PEG allergy requires extra precautions because PEGs are widely used in medications and personal care products.

Note: If your PEG allergy is still under investigation or has not been formally diagnosed, it may not be necessary to carry an allergy card or wear a medical alert bracelet at this stage. It is important to avoid self-diagnosing or labelling conditions prematurely, as this could lead to confusion and unnecessary avoidance.

Always consult with your allergy specialist about the best course of action.

Carrying adrenaline

The Medicines and Healthcare products Regulatory Agency (MHRA) recommends that you carry **two** adrenaline devices **at all times**.

Options currently available on prescription in the UK include:

- **Adrenaline auto-injectors (AAIs)** – such as EpiPen and Jext.
- **Intranasal adrenaline** – EURneffy, a needle-free nasal spray.

You must always carry two in-date forms of prescribed adrenaline at all times as a second dose may be needed if symptoms do not improve after five minutes or get worse.

For more details, read our [Adrenaline Factsheet](#).

[Find out more about what to do in an emergency.](#)

You should also share an anaphylaxis action plan with family, schools, or coworkers. The BSACI has allergy action plans available to [download from its website](#).

Daily life tips for avoiding PEGs

- **At the pharmacy:** ask staff to double-check for PEGs in medications.
- **Buying cosmetics:** choose PEGs-free brands (often labelled "natural" or "organic").
- **Medical procedures:** inform healthcare providers about your allergy, as some products like ultrasound gel or bone cement may contain PEGs.
- **Travelling:** learn how to say "**PEG allergy**" in the local language and carry a [translated allergy card](#).

Covid-19 vaccinations

The Pfizer and Moderna mRNA-based covid-19 vaccines both contain PEGs. The [Green Book](#) (which provides the latest information on vaccines and vaccination procedures in the UK) says individuals with PEG allergy should seek the advice of an allergy specialist before covid-19 vaccination, and if the decision is made to administer an mRNA vaccine then this should be done in a hospital under medical supervision. However, as allergy clinics are no longer able to administer COVID-19 vaccines, it is likely that hospitals may advise administration in primary care or in a high risk hub.

What's next?

Research priorities for PEG allergy include:

1. better diagnostic reagents and criteria to ensure accurate testing.
2. population studies to understand why some people are at higher risk.
3. improved labelling of PEGs in medicines and vaccines to help patients and healthcare professionals identify potential risks.

Key messages

- **PEG allergy is very rare** but see your GP if you suspect it.
- **Specialist testing is essential for diagnosis.**
- Most patients with PEG allergy will have a history of immediate severe allergic reactions to **several different, unrelated classes of drugs.**
- There is a small risk of anaphylaxis with any vaccine.
- PEG allergy diagnosis can be challenging. The hope is that increased awareness of PEG allergy and improved access to PEG allergy testing will lead to earlier diagnosis and reduce the risk of exposure.
- Always carry **two** in-date adrenaline devices and keep them with you **at all times.**

Feedback

Please help us to improve our information resources by sending us your feedback at: -

<https://www.anaphylaxis.org.uk/information-resources-feedback/>

Sources

All the information we produce is evidence based or follows expert opinion and is checked by our clinical and research reviewers. If you wish to know the sources we used in producing any of our information products or you would like a version of this factsheet with the references included, please contact info@anaphylaxis.org.uk and we will gladly supply details.

Reviewers

The content of this factsheet has been peer-reviewed by Dr Shuaib Nasser, Consultant in Allergy and Asthma at Cambridge University Hospitals NHS Foundation Trust.

Disclosures

Dr Shuaib Nasser is co-author of four of the studies used to develop this factsheet.

Disclaimer

The information provided in this factsheet is given in good faith. Every effort has been taken to ensure accuracy. All patients are different, and specific cases need specific advice. There is no substitute for good medical advice provided by a medical professional.

About Anaphylaxis UK

Anaphylaxis UK is the only UK-wide charity solely focused on supporting people at risk of serious, life-threatening allergic reactions. We provide information and support to people living with allergies through our free national helpline and local support groups. We also raise awareness and fundraise to achieve our ultimate aim, to create a safer environment for all people at risk of serious allergies. Visit our website www.anaphylaxis.org.uk and follow us to keep up-to-date with our latest news. We're on Facebook @anaphylaxisUK, LinkedIn, Instagram @anaphylaxisUK, Twitter @AnaphylaxisUK and you can find our podcast [here](#).